

On Farm
Euthanasia
of Swine -
*Options for
the Producer*



Euthanasia is defined as a
humane death occurring
without pain or distress.

It is inevitable that in every swine production system, animals will become ill or injured in such a way that euthanasia will be necessary. Since it is usually impossible or impracticable for the veterinarian to be available for all euthanasia on-farm, producers themselves often need to perform humane euthanasia of pigs.

When making decisions regarding ill or injured pigs, producers must consider pig welfare, economics, and public health. This brochure is designed to aid producers in making the appropriate decisions regarding euthanasia of swine. Swine producers and their employees should read this brochure, discuss the options with their veterinarian, and fill out the action plan at the end of this brochure. The action plan should be reviewed annually with a veterinarian and all employees.

The final decision for action on any ill or injured pigs usually falls into 4 broad categories:

1. **Treatment** - If an appropriate medical treatment is available.
2. **Slaughter** - If the animal is suitable for transport and human consumption.
3. **Sell or Transfer** - This option may be appropriate in case of injured or disadvantaged pigs that may perform adequately in a different production setting.
4. **Euthanasia** - Humane euthanasia may be the best option for various pig welfare, economic, and public health reasons.

As shown in Table 1, there are various methods of humane euthanasia in pigs. The first step is to consider which methods might be considered in each phase of production for each particular farm. Table 2 outlines the considerations for specific methods of euthanasia.

Table 1: Size-related Appropriateness of Various Euthanasia Methods in Swine

	Farrowing pig less than 3 weeks (12# or 5.5 kg)	Nursery pig less than 10 weeks (70# or 32 kg)	Grower pig (less than 150# or 68 kg)	Finisher pig (greater than 150# or 68 kg)	Mature animal, sows or boars
Carbon Dioxide (CO₂)*	yes	yes	not practical	not practical	not practical
Gunshot	no	yes	yes	yes	yes
Captive Bolt	no	yes	yes	yes	yes
Electrocution	yes	yes	yes	yes	yes
Anesthetic overdose	yes	yes	yes	yes	yes
Blunt trauma	yes	no	no	no	no

* CO₂ means Carbon Dioxide, NOT Carbon Monoxide (CO). Carbon Monoxide is a method of euthanasia but is not currently recommended because of its high potential as a human health hazard.

Considerations for euthanasia:

When humane euthanasia is the most appropriate option, the following considerations must be made when choosing the appropriate method:

- **Human safety:** The method must not put producers or their employees at unnecessary risk.
- **Pig welfare:** The method should minimize any pain or distress on the animal.
- **Practicality/technical skill requirements:** The method should be easily learned and repeatable with the same expected outcome.
- **Cost:** The method should be economical for the producer.
- **Aesthetics (degree of unpleasantness for the observer):** The method should not be objectionable to the person administering the procedure.
- **Limitations :** Some methods are only suitable for certain sizes of pigs or certain locations.

Table 2 outlines specific euthanasia methods with regards to the above considerations.

Table 2: Specific Euthanasia Methods for Swine			
	Human Safety Risk	Pig Welfare	Skill Required
Carbon Dioxide	low, use in well ventilated area	good, causes respiratory arrest, used in some packing plants	low
Gunshot	moderate to high, training needed, security of firearms	good, correct placement essential	moderate
Penetrating Captive Bolt	moderate to high, training needed	good, correct placement essential	moderate
Electrocution	low if proper lock out/tag out procedures followed and commercial hog stunner used	good, immediate unconsciousness followed by cardiac fibrillation	low, proper training required
Anesthetic Overdose	low if assistance for holding is available	good, anesthesia followed by respiratory and cardiac arrest	high, proper training for intravenous injection essential
Blunt Trauma to Head	very low	good if performed in small pigs with rapid force strong enough for instantaneous death	low, proper training required

Cost	Aesthetics	Limitations
moderate, initial cost of equipment, CO ₂ supply	very clean procedure, some terminal movements possible	may only be practical for small pigs
moderate, initial cost of firearm, ammunition	discharge of blood from wound	some skill and training required, not for small pigs
moderate, initial cost of captive bolt gun	discharge of blood from wound, should be followed by severing a major artery in adult animals	some skill and training required, not for small pigs
low after initial cost of proper electrical system	muscle contraction due to electricity	300 V electricity and proper lock out/tag out essential, commercial hog stunner recommended
high, FDA regulations and control apply	terminal gasping is possible	applicable agents available only to licensed veterinarian, carcass disposal
none	may be emotionally unacceptable	only applicable to small pigs

Details of Table 2

1. Carbon Dioxide (CO₂) - CO₂ causes rapid onset of anesthesia with subsequent death due to respiratory arrest. It is very safe for personnel, low in flammability and relatively inexpensive. The main disadvantage is that swine may demonstrate transient muscle spasms prior to death. This effect is probably a physiologic response after onset of anesthesia rather than an indication of emotional stress. The spasms are less intense in stress gene negative pigs than stress gene positive pigs.

CO₂ is heavier than air, therefore when constructing a container for swine euthanasia the outlet valve should be located at the top so that the container can be completely filled with CO₂ while air is allowed to escape. For small pigs a garbage can with the inlet and outlet valves installed in the lid plus a plastic bag liner can be used. After checking for complete euthanasia, the bag containing the pigs can be removed.

2. Gunshot and penetrating captive bolt - These methods stun or kill depending on size, by concussive force and penetration into the brain. Use in adult animals may only stun, therefore it is recommended that the carotid (neck) or brachial (armpit) artery be severed once the pig is stunned. Both methods are practical when used by an experienced person. Extra care must be taken to insure human safety when using firearms. The user should be trained in firearm safety and understand the potential for ricochet. A .22 caliber rifle is most commonly used. Shotguns are sometimes used to reduce the potential for ricochet. Animals should be secured by a rope or snare over the upper jaw held by an assistant. The assistant should always stand behind the shooter. If using gunshot, the animal should be restrained outside of the building on soil where danger from ricochet is reduced.

Correct positioning for this method is critical. The shot should be directed at the midline of the forehead 1 finger width above eye level. The penetrating captive bolt should be placed **very firmly** against the skull and directed upward approximately 20° toward the brain. A charge large enough to cause the bolt to penetrate the skull of a sow or boar should be used (0.22 3gr Green cartridge). The gunshot method requires that the

Continued on next page . . .

Details of Table 2 *continued*

firearm to be held about 2 to 10 inches from the skull at the same position described for penetrating captive bolt.

- 3. Electrocutation** - Electrocutation is also considered a humane form of euthanasia. It induces death by insensibility of the brain followed by cardiac fibrillation which causes cerebral anoxia (no oxygen to the brain). A two step procedure is recommended for euthanasia by electrocutation.

First the pig must be rendered unconscious. If electrical stunning is used, electrodes must be placed on opposite sides of the head so that current travels through the brain. Secondly, the current should be redirected through the heart of the unconscious pig to induce cardiac fibrillation. This will ultimately result in cerebral anoxia and death. Some literature may refer to a one step procedure, colloquially known as the "head to leg" procedure where unconsciousness and cardiac fibrillation are simultaneously induced. This method is currently approved in other countries, but has not yet been reviewed for the United States by the American Veterinary Medical Association. Methods where the current is directed only to the heart are not acceptable.

For large market weight hogs, the minimum of 1.25 amps at 300 volts for 1 second should be used. When properly applied, electrical stunning induces instantaneous unconsciousness.

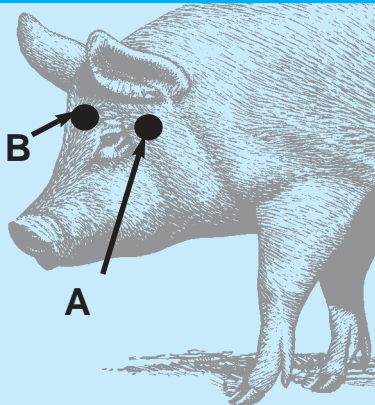
The biggest disadvantage of electrocution is the hazard to human safety if proper lock out procedures are not in place. For both humane and safety reasons a commercially available hog stunner should be used as a power source. This apparatus contains an isolation transformer which improves electrical safety and provides sufficient amperage to instantly induce unconsciousness. Electrocutation is not a useful method for euthanasia of multiple animals because it requires too much time per animal.

- 4. Anesthetic overdose** - Barbiturates and pentobarbital combinations are used to depress the central nervous system, causing deep anesthesia progressing to respiratory and cardiac arrest. This is considered a very humane form of euthanasia but it does require intravenous injection into the animal. Federal drug regulations require the drugs to be bought, stored, and used under supervision of an individual registered with the US Drug Enforcement Administration (DEA). These animals must be properly disposed of according to state law.
- 5. Blunt trauma** - This is a humane and economic method but may be objectionable to the person administering the method. A sharp, firm blow with a heavy blunt instrument on the top of the head over the brain is an efficient way of humanely killing pigs less than 3 weeks of age. It is essential that the blow be administered with determination and swiftly and firmly enough to ensure quick, humane euthanasia and not just stunning.

Captive Bolt / Gunshot

Figure 1: Humane destruction of pigs.

"A" indicates recommended position for temporal method. (Suitable for firearm only.)
"B" indicates recommended position for frontal method, at the appropriate angle (Suitable for firearm or captive-bolt pistol).



Blunt Trauma Method

Figure 2: Humane destruction of pigs. A sharp, firm blow with a heavy, blunt instrument, on the top of the head, over the brain, is an efficient way of humanely killing pigs less than three weeks of age. It is essential that the blow is administered swiftly, firmly and with absolute determination. If there is any doubt whether the pig is dead, the blow should be repeated.

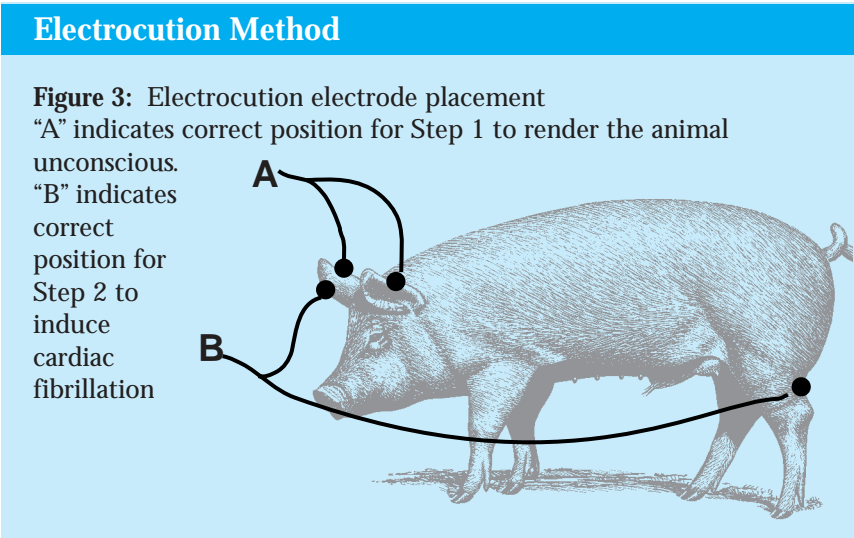
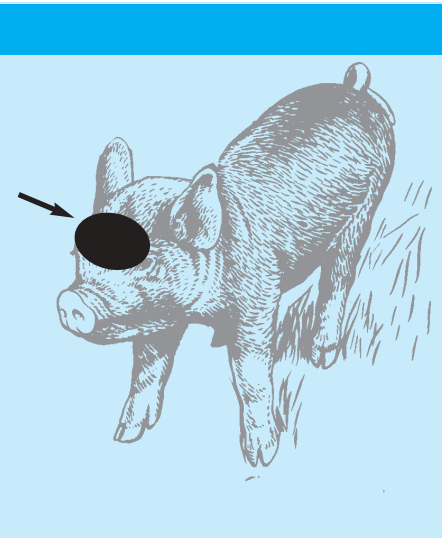
Below is an example action plan for a swine herd.

Euthanasia Action Plan

Farm Name: *XYZ Farm*
Date: *Month/Day/Year*
Drafted by: *Joe Smith, producer*
Dr. John Doe, veterinarian

Phase of production	Euthanasia method of choice	Alternative method of euthanasia
Farrowing piglets (<12lb or 5.5kg)	<i>CO₂ chamber</i>	<i>blunt trauma</i>
Nursery (<70lb or 32kg)	<i>Penetrating captive bolt</i>	<i>gunshot</i>
Grow/Finish (up to 300lb or 136kg)	<i>Penetrating captive bolt</i>	<i>gunshot</i>
Mature animals (sows, boars)	<i>Penetrating captive bolt</i>	<i>gunshot</i>

Work with your veterinarian to outline a plan stating which method of euthanasia will be used during each phase of production on your farm. Attention must be paid to the potential for pathogen spread when selecting a method of euthanasia. Use the blank form provided. Post the plan in a centralized area as a guideline for humane euthanasia of pigs on your farm. Remember to review the plan with any new employees and annually as a reminder to all.



Electrocution Method

Figure 3: Electrocution electrode placement
“A” indicates correct position for Step 1 to render the animal unconscious.
“B” indicates correct position for Step 2 to induce cardiac fibrillation

Euthanasia Action Plan

Farm Name: _____

Date: _____

Drafted by: _____

Phase of production	Euthanasia method of choice	Alternative method of euthanasia
Farrowing piglets (<12lb or 5.5kg)		
Nursery (<70lb or 32kg)		
Grow/Finish (up to 300lb or 136kg)		
Mature animals (sows, boars)		

Conclusion

Regardless of the method used, personnel should work with their veterinarian to be trained to check for cessation of corneal reflex, respiration, and heart beat to confirm the death of the pig. Details of each technique are included to allow you to design an appropriate plan for euthanasia during the various stages of production. All of the methods listed in this brochure are considered humane for the pig when properly performed within the limitations listed. Methods selected and disposal of euthanized animals must be according to state law.



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